

# **Mass Clustering Update**

**Ivan K. Furić, UChicago**

**Ilya Kravchenko, MIT**

**Semileptonic B Meeting, July 27, 2004**

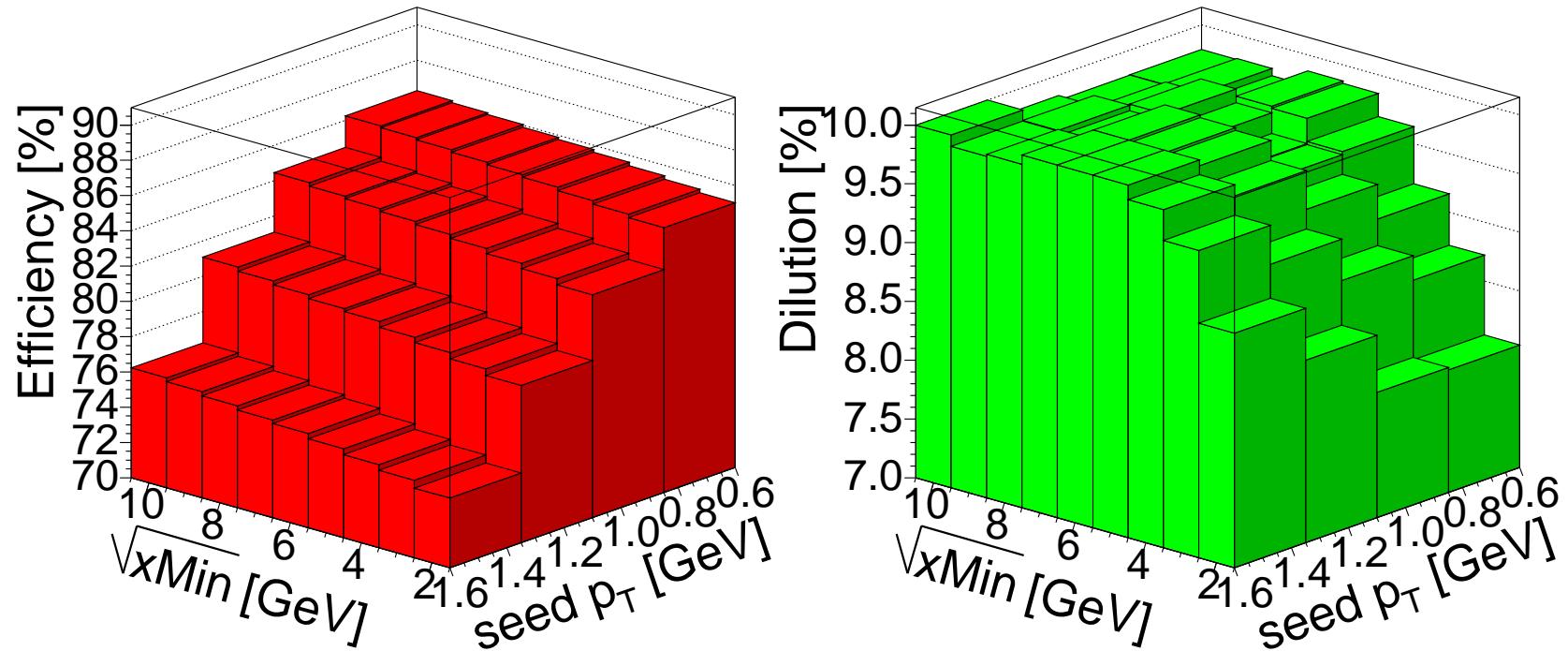
# Introduction

- attempt to improve JQT with alternate clustering method
- last week: a look at Monte Carlo distributions,
- a first peek at the tuning on data
- this week: the tuning results and performance

# Tuning Procedure

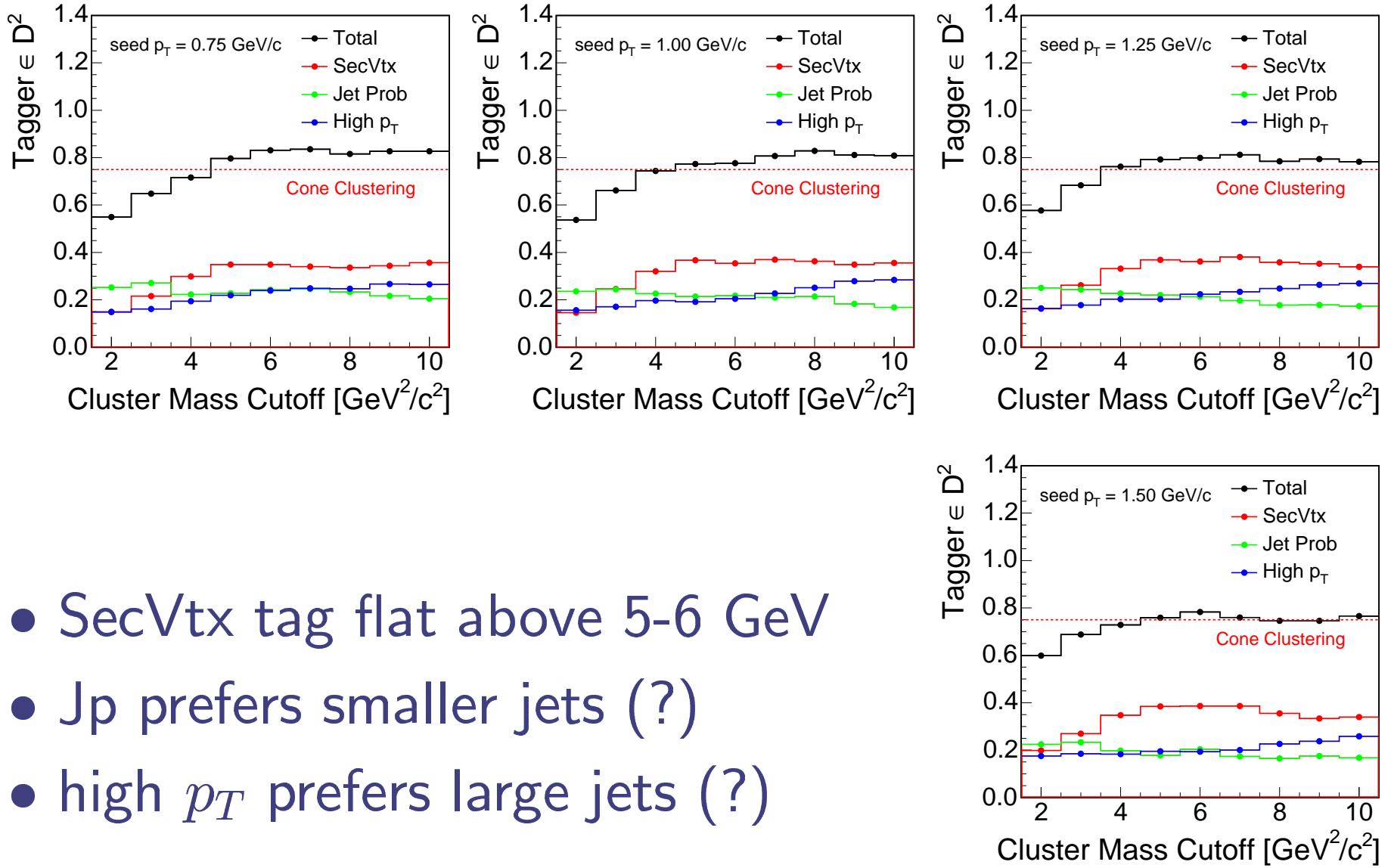
- mass clustering is driven by two parameters:  
 $p_T(\text{seed})$ ,  $x_{Min}$
- run on  $\mu$ -SVT sample, vary tuning parameters
- vary  $x_{Min}$  from 4 to 100  $\text{GeV}/c^2$
- vary  $p_T(\text{seed})$  from 0.75 to 1.50  $\text{GeV}/c$
- pick point of best performance ( $\epsilon D^2$ )
- measure  $\epsilon D^2$  in electron-SVT sample

# Tuning Plots: $\epsilon, \overline{D}$

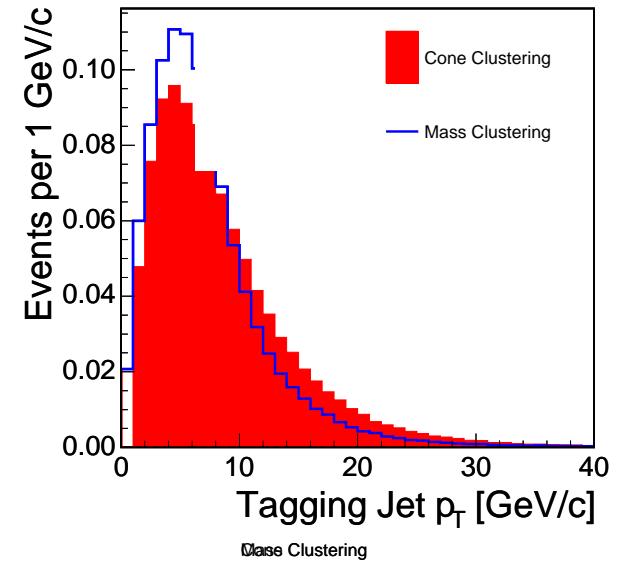
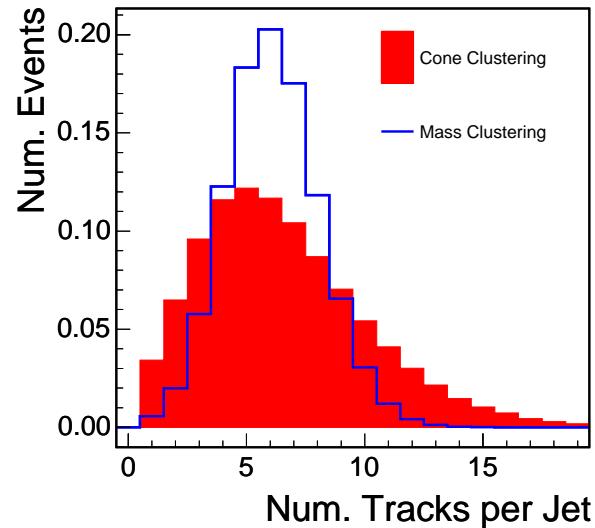
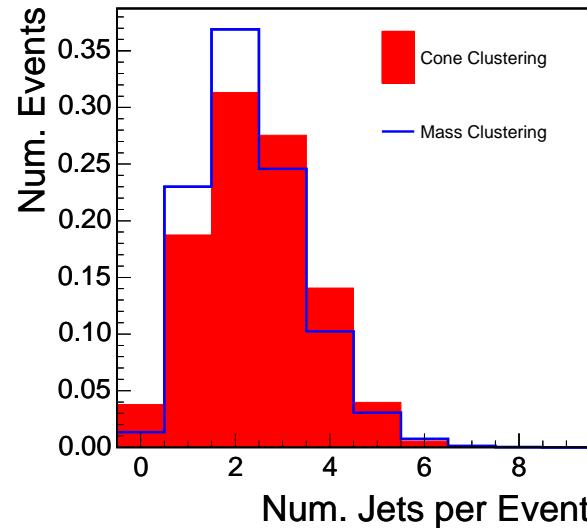


- tagger efficiency driven by seed  $p_T$
- dilution rises with  $\sqrt{x_{Min}}$ ,  $\sim$  flat above 6 GeV/ $c^2$

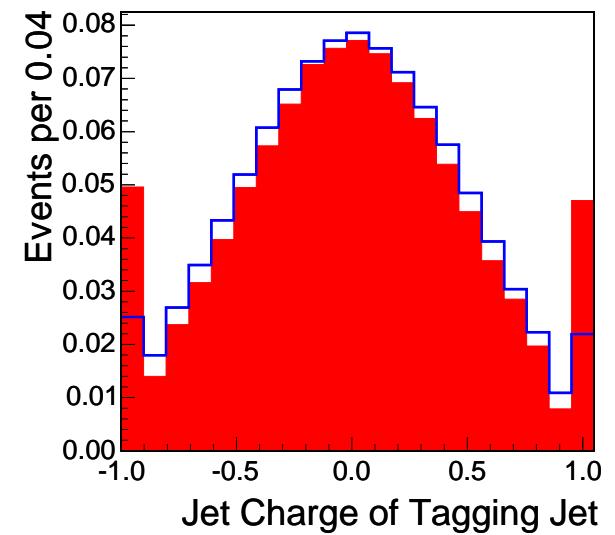
# Tuning Plots: $\epsilon D^2$



# Comparison with Cone Clustering



	Cone	Mass
$\overline{n}_{Jets}$	2.6	2.5
$\overline{n}_{Track}$	6.8	6.2
$\overline{jet\ p_T}$	8.8	7.2



# Performance Comparison

Cone Clust	Efficiency	Dilution	$\epsilon D^2$
SecVtx Jets	$10.84 \pm 0.06\%$	$44.8 \pm 2.6\%$	$0.357 \pm 0.017\%$
Jp Jets	$19.15 \pm 0.09\%$	$24.5 \pm 2.0\%$	$0.298 \pm 0.024\%$
High pT Jets	$53.39 \pm 0.14\%$	$12.4 \pm 1.2\%$	$0.141 \pm 0.011\%$
combined	$83.39 \pm 0.18\%$	—	$0.796 \pm 0.032\%$

Mass Clust	Efficiency	Dilution	$\epsilon D^2$
SecVtx Jets	$10.57 \pm 0.06\%$	$42.4 \pm 2.5\%$	$0.351 \pm 0.017\%$
Jp Jets	$20.43 \pm 0.09\%$	$26.9 \pm 1.9\%$	$0.311 \pm 0.020\%$
High pT Jets	$54.53 \pm 0.14\%$	$13.5 \pm 1.1\%$	$0.190 \pm 0.013\%$
combined	$85.53 \pm 0.18\%$	—	$0.851 \pm 0.029\%$

- comparison done in e-SVT sample
- Loss in SecVtx and gain in Jp compensate
- main gain from high pT jets → total of 7% gain

# Monte Carlo

- PYTHIA msel 1 Monte Carlo + full GEANT
- generated by Claudia Lecci & Ilya
- filtered with LeptonSvtSel / Filter ...
- run through same analysis as data
- compare distributions for cone/mass clustering
- **attention:** MC has error bars in the following plots  
(lower statistics than data)